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Type of autoclave :

Serial number :

Year of manufacture :

max. Operating pressure :

max. Operating temperature :

Volume of pressure chamber :

Examined pressure :

Date of examination :

SMALL-BATCH STERILIZER

Type KL and TKL-MCS

STAINLESS STEEL 18/10

KL

TKL-MCS

OPERATING INSTRUCTIONS

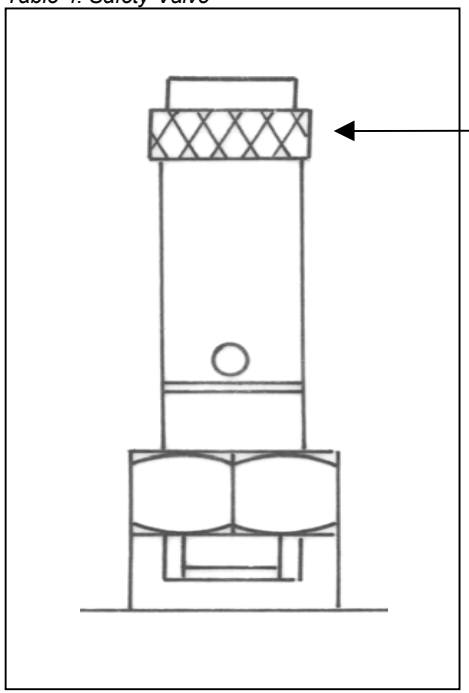
HIGH-PRESSURE SMALL-BATCH STERILIZER

For sterilization in steam and water under pressure up to 2 bar = 134 °C and up to 3 bar = 143°C

Edition of 07.01.2003

6.2 Operating Test of Safety-Valve

Table 4: Safety-Valve



Start of the Test:

- Turn the knurled-screw in counter- clockwise direction
- After an evident audible crack stop turning of the knurled-screw
- Now turn the knurled-screw in clockwise-direction back to start position.

The audible crack while turning the knurled-screw signals the functioning of the safety-valve.

If during the test **the crack is not audible**, the safety-valve **is out of order**.
In this case the safety-valve **has to be replaced unconditional** before the next use of the sterilizer.

WARNING: A **Cleaning or Repair** of the safety-valve can only **be made by the manufacturer.**

Any change or manipulation at the safety-valve, except the operating test, can be followed by a damage of the equipment or in case to Explosion of the pressure chamber.
⇒ **DANGER TO LIFE !**

DECLARATION OF CONFORMITY „CE“

According to the EG-directives

89/336/EWG edition of. 93/31/EWG „Electromagnectical Compatibility“
73/23/EWG „Low Tension“

Type and models of products

Autoclave Type : TKL – MCS – 53
Autoclave Type : TKL – MCS – 73
Autoclave Type : TKL – MCS - 122

It is declared that the above mentioned products in conception and type of construction, also in the mode of design traded by us, meet the above directives.
This declaration is going to loose its validity in case of changes not agreed by us.

In accordance to following international Regulations:

DIN EN 61010 – 1 (VDE 0411 – 1)
DIN EN 61010 – 2 – 041 (VDE 0411 – 2 – 041)
pr EN 61000 – 4 – 2 pr EN 61000 – 4 - 4
EN 61000 – 4 – 11 EN 55011 or. EN 55022

In accordance to national directives/technical specifications:

pr DIN 58951 – 2 IEC 801 - 5

ADOLF WOLF SANOclav

Bad Überkingen , 07.01. 2003

Adolf Wolf .

Managing Director

2. Preheating and after-heating temperature

Preheating: If the media sensor has been activated while the „F“ key (start key) has not been depressed, the autoclave is preheated to an „operating readiness“ temperature of 60°C.

After-heating: After sterilization the autoclave is cooled down to 60°C, when the media sensor remains activated. This temperature is maintained until the autoclave is switched off so that nutrient media can be further processed.

5 Optional extras: Port for Documentation

The port for documentation of the sterilization cyclus only works together with the MCS-processor.
It allows the transfer and documentation of sterilizationprocess on an external PC.

6 Maintenance and Care

WARNING: It is imperative that maintenance and care are completed according to the following table to prevent damage and injury and to achieve the required sterilization result.

6.1 Inspection, Maintenance and Cleaning

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73337 Bad Überkingen-Hausen/Germany

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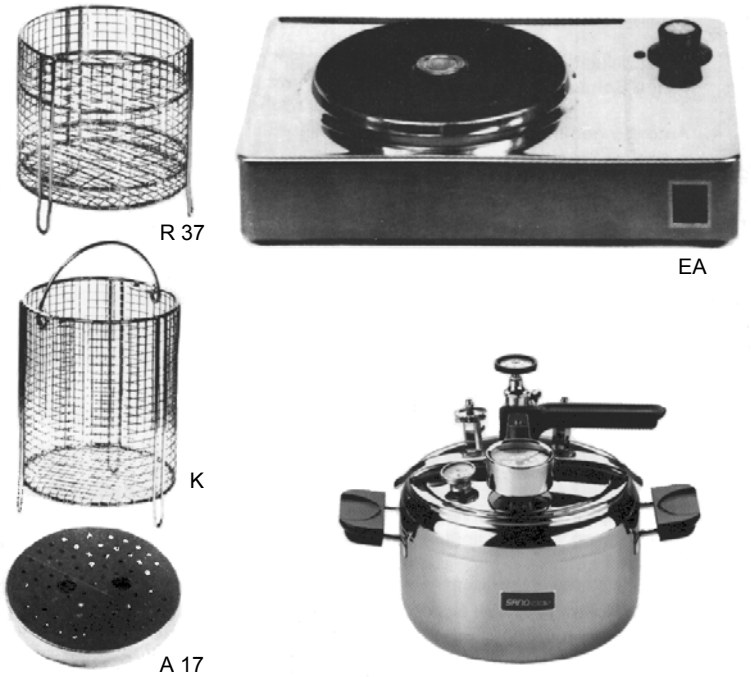
3 Accessories

Table 8, Accessories list

Abbre-viation	Designation
KB	Condense container
R 37	Test tube rack ∅ 16 × 17 cm for 37 tubes for use in 7-litre and 12-litre autoclaves
E A	Automatic-cooker 230 V / 1500 W (2000 W) continuously variable ∅ 16 cm plate, incl. Cable
A 17	Sieve tray ∅ 17 × 3 cm – with cross perforations – double grip hole, aluminium, for KL 5 and KL 7
A 20	Sieve tray ∅ 20 × 2 cm – with cross perforations – double grip hole, aluminium, for KL 12
K-5	Sieve basket for 5 L STAINLESS STEEL, ∅ 16 × 12,5 cm
K-7	Sieve basket for 7 L STAINLESS STEEL, ∅ 16 × 16 cm
K-12	Sieve basket for 12 L STAINLESS STEEL, ∅ 20 × 18,5 cm

Fig. 3 Accessories



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7. The autoclave is heated up to the entered setpoint temperature. A flashing dot at the bottom right-hand side of the display indicates when the sterilization time has started. **CAUTION:** Renewed depression of the "F" key will abort the process.

8. The heating system is switched off when the sterilization time has elapsed, and the autoclave cools down. been The cooling down process can be accelerated when solids have sterilized by slightly opening the exhaust steam valve (WARNING: Not with liquids ⇒The autoclave is heated up to the entered setpoint tem delayed boiling!).When the display shows **ENDE** the sterilization is ready. When you press the button **F** the display shows the chamber temperature again.

1.1 Explanation of symbols

DANGER: This symbol draws attention to a dangerous electrical voltage. Non-observance through direct or indirect contact can result in serious injury and even death!

WARNING: This symbol draws attention to a dangerous situation (location). Before the device is operated it is imperative that these operating instructions are read and understood completely.

1.2 Acceptable risk

DANGER:

1. Removal of the control housing gives rise to the danger of direct contact with live parts of the device.

2. Only qualified personnel are allowed to open the control housing when the device is disconnected.

3. The autoclaves with electrical heater must only be connected to an earthed, shock-proof socket conforming with the requisite safety requirements.

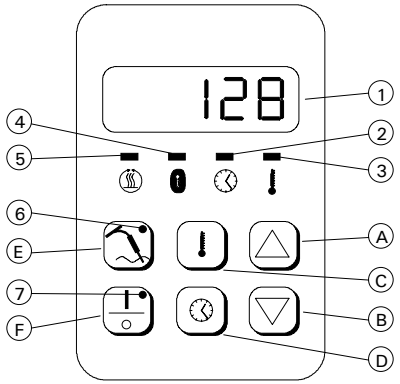
The MCS control (microcomputer) permits digital time and temperature control with a PT 100 sensor and an analogue pressure display. The data of the electrical heating system are either 230 V/2000 W/50 Hz (TKL-MCS 123) or 230 V/1500 W/50 Hz, depending upon the given model. MCS control eliminates the need for manual control, and it also means that the autoclave does not have to be supervised during operation.

Follow the subsequent steps to complete a sterilizing cycle:

A: Preparations for operation

WARNING: Please observe the "Safety Instructions" and "Acceptable Risks" (Chapters 1. and 1.2), but particularly the section "Preparations for Operation".

Fig. 2: Keypad of the MCS control



Displays:
(1) Digital display for temperature, time and status
(2) LED indicator for time
(3) LED indicator for temperature
(4) LED indicator for door contact/lock
(5) LED indicator for heating
(6) LED indicator for ON/OFF medium sensor status
(7) LED indicator for ON/OFF autoclave status

Key functions:
A) Edit key "Increase Value"
B) Edit key "Reduce Value"
C) Temperature setpoint key
D) Time, setpoint time and reset time key
E) Media sensor changeover key
F) ON/OFF device key

WARNING: Preparation for operation:

1. Never sterilize in your autoclave :
   ⇒ packaged solid matter
   ⇒ fluids in closed containers
   Closed containers may, in case of a sudden fall of pressure (e.g. autoclave is opened at a temperature of over 70°C), lead to a retardation of ebullition and explode.
   ⇒ **dangerous fluids (see page 9)**

2. Sterilization products that are sensitive to rust must only be sterilized with alkalised fresh water. For this purpose add 2% of soda to the fresh water. Please note that alkalised water will attack sterilization products made of aluminium.

3. Distilled water will eventually damage enamel. Consequently, only use tap water.

4. Sterilization results will be inadequate if the water level falls short or exceeds the minimum and maximum quantities, and there is an added risk of injury by emitted hot water. Please refer to the corresponding details in these Operating Instructions.

5. Pay attention:
   ⇒ that the rubber gasket is correctly seated when the autoclave is closed.
   Leaks can result in inadequate sterilization.

6. Operation of the device without water can damage the heating system.

7. Ensure that sterilization products do not get into reaction with the operating water.

2.6.3 Sterilization by boiling in water under pressure

All steps and safety measures described in Section 2.6.1 must be observed, together with the following additional requirements:

1. Fill the pressure vessel with tap water until the product that is to be sterilized is adequately covered.
   CAUTION: Never fill more than ¾ of the hight of pressure chamber.

2. To avoid breakage, glass parts should be placed in the water while it is still cold.

2.6.4 Other uses of the autoclave

1. The temperature must be below 100°C, and the valves must remain open, when the autoclave is used for the cultivation of nutrient media or as an incubator. The temperature must be controlled by adjusting the heating source accordingly.

   The autoclaves are not permitted to cultivate nutrient media, which are used for In-vitro-diagnostics.

2. With oil-bath sterilization it is necessary to use appropriate containers to hold the sterilization oil and the instruments that are to be sterilized.

WARNING: <u>After sterilizing:</u>

1. Never open the lid while the autoclave is under pressure. The hot steam can cause serious injuries to the hands and face.

2. For taking out the still hot sterilization products always use gloves or a suitable pliers.

Indication: If there should be formed a vacuum during cooling down, it can be removed by lifting whistle valve cone. For autoclaves with MCS-controller the exhaust valve has to be opened.

A: After sterilizing solids:

1. Ensure that emitting steam is not directed at a person when the steam pressure is vented.

We recommend the use of our sieve tray or sieve basket (accessories) to achieve uniform heating of the liquid container.

For sterilization of liquids we recommend the use of a media-sensor for autoclaves with MCS-controller (see chapter 4).

2. The liquid container must be surrounded by an adequateamount of water to guarantee the best possible transmission of heat. (**CAUTION:** Never fill the pressure chamber more than ¾ full!).

B: During operation

WARNING: Please observe the "Safety Instructions" and "Acceptable Risks" (Chapters 1. and 1.2), but particularly the section "During Operation".

The same steps as those described in Section 2.6.1 B must be observed during operation and, additionally, the following points:

CAUTION: To achieve the required sterilization effect, for autoclaves without media sensor the sterilization time has to be extended by additional time (see table 6),depending on the liquid volume for each container.

table 6: Additional time for sterilization of liquids

Liquid volume of each container	Additional time to sterilization Time
0,5 Litre	15 Min.
1 Litre	20 Min.
2 Litres	25 Min.
3 Litres	30 Min.

WARNING: Inspection, maintenance and care:

1. It is imperative that the cleaning, maintenance and inspection instructions of these Operating Instructions are observed. Non-observance can result in inadequate sterilization and damage both the autoclave and the product that is being sterilized.

2. **Never change autoclaves in any way, particularly**
   ⇒ the safety valve
   ⇒ whistling valve
   ⇒ steam-regulating valve
   The valves are works adjusted. Any change of the settings can result in inadequate sterilization, damage the product that is being sterilized and the autoclave, and even cause the vessel to explode.

3. Non-observance of the autoclave checks stipulated by the manufacturer can result in inadequate sterilization, damage the product that is being sterilized and the autoclave, and even cause the vessel to explode.

4. The use of tap water will result in scaling. This will damage the tubular heaters and increase the power consumption of strip heaters. Regular descaling is therefore essential.

5. The autoclave **must be stored in an open condition** so that mould cannot form inside the moist autoclave.

4. ⇒ adjust the whistling valve by its knurled screw to the required operating temperature (indicated in the cut-out of the scale disc), e.g. 3 bar.
   ⇒ then open the pressure control valve by turning it clockwise until the stop point is reached. The autoclave must be vented during the heating up stage.
   ⇒ the heating system can then be switched on at full capacity.

B: During operation

WARNING: Please observe the "Safety Instructions" and "Acceptable Risks" (Chapters 1. and 1.2), but particularly the section "During Operation".

1. The autoclave is adequately vented when a strong jet of steam is being emitted by the pressure control valve (approx. 100°C thermometer display). Close the pressure control valve.

2. The acoustic warning signal of the whistling valve indicates that the required operating pressure has been reached. Close the whistling valve by turning it to the right until the stop point is reached. (Please note: The figures of the scale disc relate to the outgoing connection of the valve). **Only from this moment onwards does the sterilization time commence.**

WARNING: Autoclaves without MCS control must be *constantly* supervised during the sterilization process!

The steam pressure control valve may have to be readjusted to ensure that the operating pressure is not exceeded or undercut (see safety instructions and acceptable risks)!

This Autoclaves are **not permitted for preparation of food.**

2.1 Fields of application

WARNING: High-pressure steam sterilization of porous (e.g. textiles) or packaged products can result in inadequate sterilization.

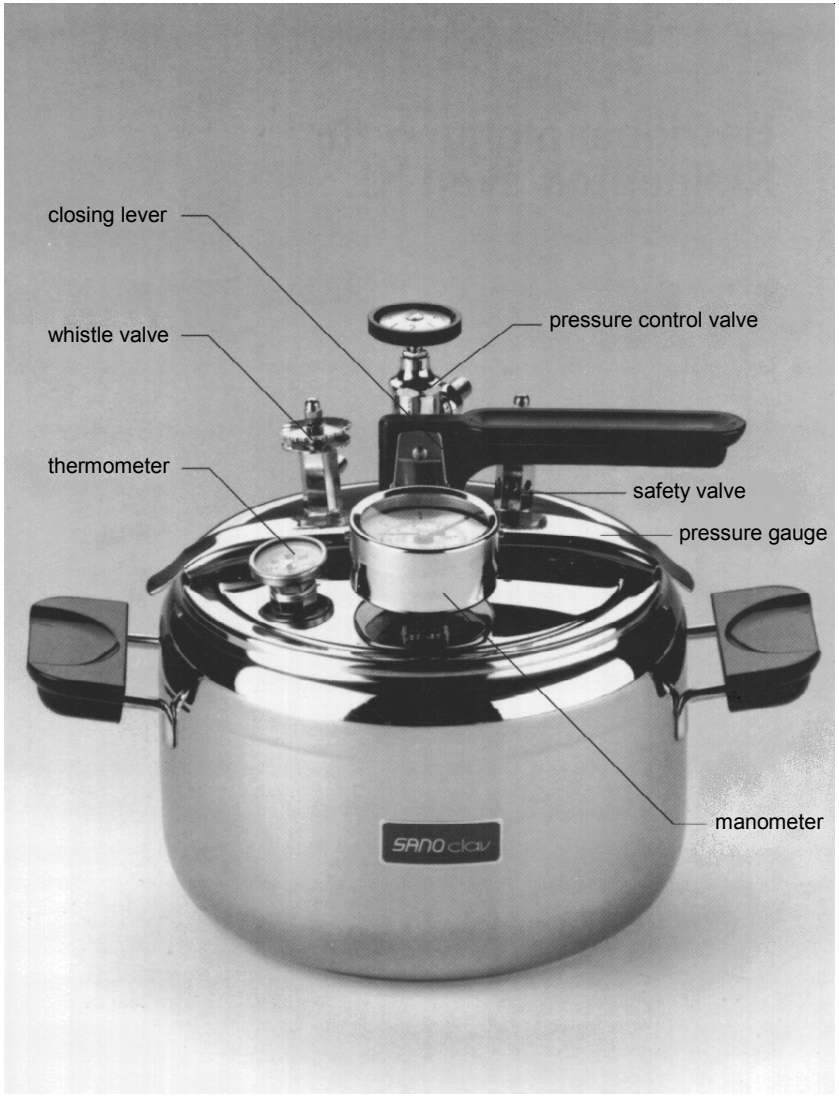
IMPORTANT: The series KL and TKL autoclaves are not admitted for sterilisation of medical products within the meaning of the European Guideline 92/42/CCE.

Table 1: Fields of application and technical data

Application / Model	1*	2*	3*	4*		Weight (kg)	Dimensions (B x H [x T] in cm)
KL-5-3	x	x	x	x		2,5	35 x 24
KL-7-3	x	x	x	x		2,75	35 x 30
KL-12-2	x	x	x	x		3,7	40 x 34
TKL-MCS-53	x	x	x	x		12,5	35 x 30 x 44
TKL-MCS-73	x	x	x	x		15	36 x 40 x 46
TKL-MCS-122	x	x	x	x		17,7	52 x 43 x 48

1* = Sterilization of solid substances.
2* = Sterilization of liquids (in general = e.g. laboratory operation). The manufacturer recommend the use of special equipment (see Section 4).
3* = Sterilization in an oil bath.
4* = Cultivation of nutrient media (laboratory area)
The sterilizers are not permitted for cultivation of nutrient media, which are used for In-vitro-diagnostics

2.6 Operation of small-batch autoclaves, type "KL"



2.3 Technical data

For dimensions and weight of the individual autoclave types please refer to Table 1.

Table 3: Technical data

Control / Parameters	MCS	MCS
Heating capacity (switching capacity)	2000 W	1500 W
Rated voltage	a.c. 230V / 50 Hz	a.c. 230V / 50 Hz
Variable tempe-rature range	0°C to max. 151°C (type dependent)	0°C to max. 151°C (type dependent)
Thermal control deviation	± 1°C	± 1°C
Timer	1 minute to 100 h	1 minute to 100 h
Fuse	T10 / 250V	T10 / 250V

2.4 Details concerning electromagnetic compatibility (EMC)

WARNING: Please observe the "Safety Instructions" and "Acceptable Risks" (Chapters 1. and 1.2), but particularly the section "Transport and Installation".

All TKL-MCS-type autoclaves comply with the guideline 89/336/EEC, version 93/31/EEC. Autoclaves are automatically adjusted to a safe condition in the event of a power failure. However, to ensure proper sterilization, autoclaves with MCS control must repeat the sterilization cycle after the power has returned.